THE ZOOLOGIST

No. 754.—April, 1904.

BIOLOGICAL SUGGESTIONS.

RIVERS AS FACTORS IN ANIMAL DISTRIBUTION.

Part I.—RESTRICTIVE ACTION.

BY W. L. DISTANT.

> I believe laws discover themselves to individuals, and not that individuals discover laws.—EDW. FORBES.
>
> I think it undesirable to give expression to theories which one may afterwards feel oneself committed to, as the investigation goes on. . . . I have often noticed in my younger sporting days—and it is a fact well known to sportsmen—that some hounds are apt to give tongue before they have got a true scent, whilst there are others whose voice can be relied upon. I am an old dog, and have always had a disposition to run mute.—Gen. PITT-RIVERS.

SOME years ago I beguiled many very quiet hours on the Transvaal veld by taking stock of my zoological note-books, and seeing how far the facts and observations I had accumulated could aid me in a solution of some biological questions which I had often pondered, but never answered. Among these was the part that the principal rivers of the earth had played in the cleavage lines of animal distribution. I had no theory, nor did I find one; for, though it seemed clear that rivers undeniably were, and had been, barriers to the migration of plants and animals, yet, on the other hand, it was equally apparent that most land animals could, and did on necessity, swim, and therefore to a great extent overcome these obstacles. Still there was so much to be said on both sides of the question, that I have continued gathering evidence, and have thought it well to publish some of the facts thus acquired, in the hope that other zoologists may also bring grist to the mill. A biological enquiry which is still unencumbered with a theory is surely a very uncommon phase of modern thought, and should be attractive on that ground alone. It is, however, suggestive to the last degree, and appertains as much to the requirements of the historical method, or perhaps more so, than to the seductive paths of speculation. I have dealt with the question in its rather contradictory phases, in this instalment recognizing the divergent action of rivers on animal distribution, and in a subsequent paper propose to record some distributional action of rivers, and to give details of land animals that can, or rather have been observed to swim.

Although rivers in the course of time have often, and do often, shift their channels, as Lyell demonstrated of the Thames and Mersey, sometimes deserting and subsequently resuming their former beds, as shown, for instance, by the courses of the Ardèche,* they still, in most cases, possess a considerable antiquity,† and have proved factors in the determination of

---

* Mardigny, *cf.* Marsh, 'Man and Nature,' p. 402.

† According to Prof. Geikie, there can be no doubt that both in Europe and North America the rivers at a comparatively recent geological period had a much greater volume than they now possess ('Text-Book Geology,' 2nd edit. p. 370). In North America the duration of the Niagara has been computed as equalling 32,000 years (J. W. Spencer, 'Am. Journ. Sci.,' December, 1894). These changes cannot always be ascribed to a great antiquity. Dr. Gregory, in discussing the former sources of the Nile, remarks:—"The proof which I hope subsequently to publish of the Pleistocene age of some of the meridional faults, and of the existence of a former outlet from Baringo over the Lobat Pass to the north, shows that the river system must have been very differently arranged in times geologically quite recent" ('Geographical Journal,' vol. iv. p. 513). Monsioa, a Bechuanaland chief, at the time (1890) more than eighty years of age, told Mr. Bryden that "he remembered Sea-cows (*Hippopotamus*) in the Molopo, and the Molopo of to-day, which, like other South African rivers, has dwindled greatly, would find it a hard matter to hold a single Sea-cow" ('Gun and Camera in South Africa,' p. 39). Mr. Bryden further remarks:—"Anciently, and before some

BRITISH MUSEUM

animal distribution. The interesting history of European rivers still remains to be written. They did not always flow along their present courses, and the Rhone appears to have been a great traveller. At least there seems reason to believe that the upper waters of the Valais fell at first into the Danube, and so into the Black Sea; subsequently joined the Rhine and the Thames, and so ran far north over the plains which once connected the mountains of Scotland and of Norway to the Arctic Ocean, and have only comparatively of late years adopted their present course into the Mediterranean.*

As a general rule even narrow seas are an effectual obstacle to migration; "in many cases wide rivers are equally effective barriers." † In Queensland, according to C. Lumholtz: "About 250 miles from the coast we passed the part of the Great Dividing Range which here forms the watershed between Eastern and Western Queensland. In this part the watershed consists of a low range. Nevertheless, no one can fail to observe the great difference in animal life on the two sides, as well as the inter-

---

great upheavals and changes in the land took place (changes that were probably most acute in the immense water systems of the Zambesi and Ngami countries, before the Zambesi was torn from its ancient southerly course and diverted to its present channel), Bechuanaland and the Kalahari must have been exceedingly well watered. Many an old rivershed, long since dry and useless, testifies to the fact" (*ibid.* p. 115). During the great drought of 1862, "the mighty Orange River could be stepped across by a child, and in its upper part at least ran dry, exposing in its bed near Hope Town the remains of a waggon which had been lost in a sudden flood while crossing the river some thirty years before" (*cf.* 'Hydrology of South Africa,' by J. Crumbie Brown, p. 112). Mr. Sharpe, in an article on British Central Africa, writes:—"With regard to the drying up or otherwise of African lakes and streams, I am inclined to doubt the theory that there is a desiccation of a permanent kind going on—that is, I mean, a drying up due to a *permanently decreasing rainfall.* It is, I think, more reasonable to suppose that, owing to some cause which is not as yet apparent, there are regular cycles in the lake regions of Africa, due to increasing and decreasing rainfalls" ('Geographical Journal,' vol. vii. p. 367). That a full average rainfall is essential is proved by the statement of Anderson in Damara Land, that so great is the rate of absorption and evaporation at this season (December and January), "that pools of from forty to fifty feet long, and several feet deep, would dry up in the course of a week" ('The Okavango River,' p. 146).

* *Cf.* Lord Avebury, 'The Pleasures of Life,' pt. i. p. 127–8.

† Dixon, 'The Migration of British Birds,' p. 102.

mediate change in the character and aspect of the country. No sooner is the range passed than we meet with the Red-breasted Cockatoo (*Cacatua roseicapilla*), which is never found on the eastern side."* Darwin, of course, noticed and recorded the same facts. He writes:—"On the opposite sides of lofty and continuous mountain ranges, of great deserts, and even of large rivers, we find different productions."† Students of mammalian geographical distribution often find the great rivers real divisional lines. Quite recently W. L. Sclater, in separating the subregions of the Ethiopian region, has used the watersheds of the Senegal, Congo, and Tana rivers for that purpose.‡ Even the distribution of the Tsetse-fly is similarly affected. Anderson states that "cattle may be seen grazing securely on one side of a river, whilst the opposite bank swarms with the Tsetse."§ Livingstone found the banks of the Chobe River separating the areas of this insect. "We lived two months in their *habitat*, which was in this case as sharply defined as in many others, for the south bank of the Chobe was infested by them, and the northern bank, where our cattle was placed, only fifty yards distant, contained not a single specimen."‖ And Austen, who has recently monographed these flies, states that, although the Tsetse no doubt occurs throughout Portuguese West Africa, there appears to be no record whatever of its having been met with south of the Congo.¶

It is, however, again necessary to reiterate here, and that most strongly, that no universal law of the kind can be found, nor is the existence of such a constant factor in animal distribution advocated,** the desire of the writer being merely to show that there are facts to prove such a connection in many cases, and

---

* 'Among Cannibals,' p. 34.

† 'Origin of Species,' 6th edit. p. 317.

‡ 'Geographical Journal,' vol. vii. p. 287; and in collaboration with P. L. Sclater, 'Geography of Mammals,' p. 100.

§ 'Lake Ngami,' p. 488.

‖ 'Miss. Trav. and Researches in S. Africa,' p. 81.

¶ 'Monograph of the Tsetse-Flies,' pp. 29–30.

** In his paper on "Biologic Regions and Tabulation Areas," Mr. C. B. Clarke states that a great river will not do for use as a permanent boundary line, "as nearly all the plants that grow on one bank may usually be found on the other" ('Phil. Trans.' vol. clxxxiii. p. 376). Readers of Buckle's 'Hist. Civilization' will probably remember an early footnote to the effect that

that many other facts and observations bearing on the question require collation. As far as his knowledge extends, in a *general* way rivers do *not* qualify the distribution of genera and species, but in a much more *limited* sense they *do*, and such facts demand consideration. Though Nature works on the same plan, she does not always use the same means, and the danger of advancing all-sufficing theories, or promoting frequent causation to a universal position, is that the equally true though infrequent factors are too often ignored or put out of court altogether. Again, great care is necessary in dealing with reports made by travellers on these fluviatile divisions, especially in areas which have been little zoologically investigated, as subsequent discovery often proves genera and species to exist where their non-extension was regarded as an almost axiom.

Reports on the distributional action of the River Congo will illustrate the last remarks. Mr. Monteiro, with reference to the southern banks of the river, states:—"The difference in the scenery and vegetation from those of the north is very great indeed, and not less so is that of the birds and animals (*sic*). I have noticed enough to convince me that it would well repay a naturalist to investigate the number of species this river cuts off, as it were, from Angola."* "Sharks, so frightfully dangerous in the surf of the West Coast, are unknown south of the River Congo. I have never heard of a person being attacked by one, although at Loanda the white population bathe off the island in front of the town, and blacks dabble about in the sea everywhere, and swim to and from the boats and barges."† The author then proceeds with other statements which have been subsequently controverted. "The Gorilla and Chimpanzee, for instance, are only known north of the Congo; they are found at Loango and Landana, and, from reports of the natives, even near to the river itself; many species of monkeys, very abundant at Cabinda

---

"the Oregon or Columbia, as it is sometimes called, forms a remarkable botanical line, which is the boundary of the Californian flora." In California, Mr. Hincliff travelled along by the side of a small river where the countless lupines were all white on one bank, and all blue on the other ('Over the Sea and Far Away,' p. 247).

* 'Angola,' vol. i. p. 53.

† *Ibid.* p. 51.

and on the north bank, are quite unknown in Angola; and the ordinary Grey Parrot, which is to be seen in flocks on the Congo, is almost unknown to the south, the only exception to this rule, as far as I have been able to ascertain, being at Cassange, about three hundred miles to the interior of Loando, where the rare 'King-Parrot,' with red feathers distributed among the grey ones, is not uncommon. Of small birds, I have noticed many at Cabinda that I never observed in Angola; the same with butterflies and other insects."* Most of these last statements have been traversed by Sir H. Johnston, who writes:—"I have read in many works on Africa, or on the distribution of plants and animals, that the Congo was the southern boundary of the habitat of the Grey Parrot, the Anthropoid Apes, and the oil-palm (*Elaïs guineënsis*). Now the Grey Parrot reaches perhaps its greatest development in Malanje, a district of Angola nearly three hundred miles south of the Congo, and, together with the oil-palm, continues to be found as far as the tenth degree south of the equator; while the Anthropoid Apes can hardly be said to be limited southward in their distribution by the lower courses of the Congo, for they do not reach even to its northern bank, or approach it nearer than Landana, one hundred miles away."† More evidence is evidently required here, and that of an analytical nature. In most instances an average result can alone be expected, for it is scarcely reasonable to believe that animal migration—both intentional and accidental—was rendered altogether nugatory by even the mighty stream of the Congo, exceeding in volume all the rivers in the Eastern Hemisphere, and in the west surpassed by the Amazons alone; while at the same time it is not unreasonable to suppose that in earlier times its separative character on the fauna was more pronounced, for animal migration is spasmodic, and requires time for perpetuation in result. Dr. Gadow, in one of the British Museum Catalogues of Birds, has recorded the interesting fact that specimens of *Lanius collaris* from the Congo have a red under surface, south of the Congo this colour is changed to orange.‡ Mr. Beddard admits the divisional effect of this river on the fauna of the country when he defines the West African subregion as extending "as far south as the Congo."*

---

* 'Angola,' vol. i. p. 53.

† 'The River Congo,' p. 318.

‡ This requires qualification, as Ogilvie-Grant, in a recent revision of the Shrikes, specifically divides the specimens placed by Gadow as appertaining to *Lanius collaris* ('Novitates Zoologicæ,' vol. ix. p. 466).

Confining our attention to the same continent, we may find examples from other rivers. The main stream of the Mackenzie River—a considerable tributary of the Tana, and so named by Chanler and Von Hohnel—may, according to Neumann, be taken as the line of demarcation limiting the ranges of both Coke's Hartebeeste and Grevy's Zebra.† Selous, writing in 1881 on the Giraffe, states that till within the last few years it was never found eastward of the River Gwelo (a tributary of the Zambesi north of Matabeleland), though it was always very plentiful in the sand-belts to the westward of that river. This fact is the more curious, since the soil, vegetation, and general appearance of the country are precisely similar on both sides of the river, which during a great portion of the year is only a succession of pools, and therefore does not offer the slightest obstacle to any animal desirous of crossing it. During the last three or four years a few Giraffes have extended their range further eastward.‡ We may perhaps here hazard the supposition that in more ancient times this waterway was of a deeper and more extensive description, and that the experience of a restricted range once caused by a physical barrier, became by hereditary transmission a conservative "instinct" in the minds of these animals, who thus seldom or never attempted to ford what was at one time a dangerous or impassable current. How often in the mental evolution of ourselves the memory of a dead legend keeps us from the easy path of truth. It may also be that the presence of Crocodiles or Alligators may often prove efficacious in preventing animals extending their range beyond a river. Bryden, when hunting on the banks of the Botletli, in South Africa, found that the Lechwê (*Cobus leché*), when pursued, always betook themselves to the water and reeds, but rarely faced the open river. One wounded individual that did brave the stream was snapped away by a Crocodile.* On the other hand, on the South American Purus, Paul Fountain describes the Deer as taking freely to the water, though several times he saw them pulled under by Caymans.† Lydekker, quoting from the writings of Milne-Edwards and Grandidier, and dealing with the Sifakas (Lemuroids) of Madagascar, relates that the various races and species are so sharply separated from one another, "that it is sufficient to cross a river—it may be of no great width—in order to find that, while on one bank all the Sifakas belong to one race, on the opposite bank they will be of another race, if not of a distinct species."‡ In Algeria, Moritz Wagner observed that the rivers which run from the Atlas range to the Mediterranean, without being very broad, still served as distinct barriers. He found certain of the smaller rodents and reptiles, certain species of beetles and snails, to be confined by the River Schelif, which they never crossed.§

---

* 'Text-Book of Zoogeography,' p. 101.

† 'Elephant Hunting in East Equatorial Africa,' p. 27.

‡ Quoted by Lydekker, 'Roy. Nat. Hist.' vol. ii. p. 333.—According to Sandeman, "a Giraffe is the most defenceless animal imaginable, and has nothing to show fight with even if so inclined; it is easily tired out and run down, so, although fleet for a short distance, it does not afford much sport" ('Eight Months in an Ox Waggon,' p. 324).

In India a similar story is told in relation to the River Ganges. According to Mr. Lockwood, the district of Monghyr, which consists of some four thousand square miles, is divided into two nearly equal portions by the Ganges. The northern part is an extensive plain formed by the rich alluvial soil brought down by the ever changing river, whilst the southern portion consists of vast rice-tracts, and forests which cover the metamorphic hills, extending far away into Central India from the town of Monghyr, three hundred miles north-west of Calcutta. "This division of the district separates also in a marked manner the most conspicuous species of the animal and vegetable kingdoms, and the sportsman who to-day may find Tigers, Bears, Baboons, Tupaias, Peacocks, Jungle-fowl, and Grey Partridge in the undulating country of the south, will look in vain for such things if to-morrow he crosses the river northward. The river separates also the most conspicuous trees and plants. In the forests of the south are found the ebony-tree (*Diospyros melanoxylon*), the sál (*Shorea robusta*), and the mahwa (*Bassia latifolia*). The south also yields vast quantities of rice and 150 tons of opium grown on 25,000 acres of land, whilst after crossing the Ganges little rice and not a single poppy will be seen. In the north nine-tenths of the trees are cultivated mangoes, whilst wheat, Indian corn, various kinds of millet, peas, masur (*Cicer lens*), rahar (*Cytisus cajan*), oats, indigo, mustard, linseed, and castor-oil are the principal crops which the landholders find profitable to grow."* Mr. Hornaday, the American naturalist, who so thoroughly collected zoological specimens during the limited time he spent in India, also casually bears witness to the same and similar facts. "The Indian Black Bear inhabits all India south of the Ganges."† The Indian Gazelle (*Gazella bennetti*), commonly called by Indian sportsmen the "Ravine Deer," "does not occur south of the Godavery River."‡ In Assam the Gibbons (*Hylobates*) do not occur north of the Brahmaputra River.§

---

* 'Gun and Camera in S. Africa,' p. 365.

† 'The Great Mountains and Forests of S. America,' p. 331.

‡ 'Roy. Nat. Hist.' vol. i. pp. 208–9.

§ Quoted by Strauss, 'The Old Faith and the New,' 2nd edit. p. 221. (Probably extracted from Wagner's 'Reisen in Algier,' a work with which I am unacquainted.)

River faunas are often considerably modified and specialized by the direction in which rivers flow, or the sea or ocean into which they empty themselves. Sir Joseph Hooker long since pointed out: "It is one of the most remarkable facts in the zoology of Asia, that no Trout or Salmon inhabit any of the rivers that débouche into the Indian Ocean (the so-called Himalayan Trout is a species of Carp). This widely distributed natural order of fish (*Salmonidæ*) is, however, found in the Oxus, and in all the rivers of Central Asia that flow north and west. The central Himalayan rivers often rise in Tibet from lakes full of fish, but have none (at least during the rains) in that rapid part of their course from 10,000 to 14,000 ft. elevation; below that fish abound, but I believe invariably of different species from those found in the sources of the same rivers. The nature of the tropical ocean into which all the Himalayan rivers débouche is no doubt the proximate cause of the absence of *Salmonidæ*."*

---

* 'Nat. Hist. Sport and Travel,' pp. 1–3.

† 'Two Years in the Jungle,' p. 146.

‡ *Ibid.* p. 72.

§ Heilprin, 'Geogr. and Geol. Distr. Animals,' p. 31.—Mention must not be omitted of Dr. Blanford's classical Memoir on the Distribution of Vertebrate Animals in India, Ceylon, and Burma, and of the use made by him of the Nebrudda and Kistna rivers ('Philosoph. Trans.' vol. cxciv. p. 345).

As with "Mimicry" and "Protective Resemblance," the solution of the riddle of geographical distribution must depend largely on the teachings of geology and palæontology. The explanation of the present is only made possible by the story of the past. Embryology, Anthropology (including Sociology)—nay, even most biological enquiries—are better understood the farther we go back. In the beginning was the great evolutionary impulse. Dr. Gregory has well remarked: "The anomalies of zoological distribution, especially in regard to the fresh-water faunas, appear still more difficult of explanation, unless considered in the light of geological changes." † Some of the large rivers still contain living links with the Triassic strata of Europe, and secondary rocks of India and South Africa, in the existing Lung-fishes (*Lepidosirenidæ*). In the Burnett and Mary rivers of Queensland, the Australian Lung-fish (*Ceratodus forsteri*) is generally considered a distinct generic survival, whilst the Mud-fish of the Amazons (*Lepidosiren paradoxa*), and its African relation (*Protopterus annectans*), so abundant in the Gambia, bear witness not only to the antiquity of the animal type, but also to the age of the streams in which they are still found.

The rivers of the American continent have a similar character. Mr. Wallace has given the cases of certain species of Saki Monkey

---

* 'Himalayan Journals,' vol. ii. p. 187.—The Salmon is unknown in any of the rivers flowing into the Mediterranean ('Roy. Nat. Hist.' vol. v. p. 495). It is also stated that in South Africa, Crocodiles "are only found in the rivers which run to the eastward" (J. Garbett Wood, 'Through Matabeleland,' p. 43). The temperature of rivers also may vary in places in a very qualifying manner for piscian distribution. E. André describes a stream as being in temperature several degrees lower than that of the Caura, owing to its being completely shaded from the rays of the sun by the tall trees of the forest through which it flows ('A Naturalist in the Guianas,' p. 137). Of course waterfalls are always obstacles. "In the Yosemite Valley, in California, for example, the Trout ascend the Merced river to the base of a vertical fall. They cannot rise above this, and so the streams and lakes above this fall are destitute of fish" (Jordan and Kellogg, 'Animal Life,' p. 274).

† 'Geographical Journal,' vol. iv. p. 512.

(*Pithecia*) found on either side of the Amazon River, whose range either southward or northward appears to be limited by that stream. The same authority instances among birds species of Jacamar (*Galbula*) and Trumpeter (*Psophia*), which exhibit a similar limitation, particularly the latter, where five distinct species are relegated to as many distinct, but contiguous, geographical areas, separated from each other by the Amazon and some of its tributaries (Negro, Madeira, Tocantins). Of about twelve species of Armadillo (separated by some naturalists into several distinct genera), most of which are inhabitants of Brazil, it would seem that not a single species is common to Brazil and the Argentine Republic, or the Argentine Republic and Paraguay, the Parana River, with its tributaries, evidently forming an insurmountable barrier to the passage of this animal.* The Uruguay River appears to limit in the same manner the eastward progression of the Viscacha (*Lagostomys trichodactylus*), an animal allied to the Chinchilla, although, as has been pointed out by Darwin, the trans-Uruguayan plains are fully as well adapted to the animal as those of its native home.† The Gallinazo, a South American Vulture (*Cathartes atratus*), is stated by Darwin as never found south of lat. 41°,‡ or the Rio Negro.

We often find considerable ethnographical differences when a great river has been crossed. According to Keller: "It is a remarkable fact that the Indians on the right shore of the Amazon neither prepare nor use the poison (urary or curare—arrow-poison), though the plants that supply the chief ingredients are certainly found there as well as on the left shore, on which tribes differing widely in custom and language use the subtle weapon."§ According to Waterton, "the wourali-poison is used by all the South American savages betwixt the Amazons and the Orinoco."‖ We receive a hint as to how rivers may have become divisional barriers among primitive tribes by the remark of Du Chaillu on the intermixture of the same in West Africa, which he explains by the reason that "the most enterprising are always striving to get possession of the rivers, which are the only highways of the country."* In East Africa, according to Faulkner, the Mavite, a marauding tribe of Kulu Kafirs, "have never been known to cross a river. They have visited the western bank of the Zambesi, where they used to come for the purpose of receiving tribute from the Portuguese, but they never crossed the river."† It is said that the people who centuries ago carried on such vast gold-mining operations in Matabeleland and Mashonaland do not appear to have worked north of the Zambesi.‡

---

* However, as Mr. Lydekker remarks, Armadillos "are said to be able to swim well and swiftly" ('Roy. Nat. Hist.' vol. iii. p. 217).

† *Cf.* Heilprin ('Geogr. and Geol. Distr. Animals,' p. 24).

‡ 'Journ. Research. Voy. Beagle,' edit. 1890, p. 55.

§ 'The Amazon and Madeira Rivers,' p. 110.

‖ 'Wanderings,' Wood's edit. p. 126.—The poisoned arrows of Java and Borneo are deadly effective, while those of the Philippines "lose their effect when not fresh" (Ratzel, 'Hist. Mankind,' vol. i. p. 416). When pondering over this question on the Transvaal veld, I ventured to write to Sir Clements

Rivers have frequently proved national boundaries, as till recently was instanced by the Orange, Vaal, and Limpopo rivers in South Africa. The Rhine is not a national boundary of to-day, but, as Gibbon writes, Valentian caused its banks "from its source to the streights of the ocean" to be closely planted with strong castles and convenient towers, and thus protected the Gallic frontier against the attacks of the Germans; or, as Peschel remarks, broad and deep rivers are rather barriers and impediments in the first beginnings of society, as, for example, even in Cæsar's day the Rhine quite separated the Celts and the Teutons.§ Renan recognized this fluviatile action, and considered the alluvial deposits of the great rivers as appearing to have been very favourable to three or four civilizations, of which we catch a glimpse at a distance of six or seven thousand years from the age in which we live. The Yellow River at the eastern

---

Markham, as to whether, as a rule, the tribes inhabiting the opposite banks of the Amazon were distinct. I was favoured with the following reply:—"I believe that your view is correct as regards rivers of great width, such as the Amazons. Even along the courses of smaller tributaries the different tribes are often confined to different banks of the rivers, but this is very far from being an invariable rule. Generally, however, in the Amazon basin, the rivers form the divisions between different tribes" (Letter, April 12th, 1895).

* 'Explorat. and Advent. in Equatorial Africa,' p. 383.

† 'Elephant Haunts,' p. 54.

‡ *Cf.* A. Sharpe, 'Geographical Journal,' vol. vii. p. 370.

§ 'The Races of Man,' p. 197.

extremity of Asia, the Ganges to the south of the Himalayas, the Tigris and the Euphrates in Central Asia, and the Nile in Africa witnessed the expansion of such societies.* The Semitic tribes who crossed the Euphrates into Syria, first of all "trans-Euphratian," but "which had become, by crossing the stream, cis-Euphratian, took the generic name of *Hebrew* (*Ibrim*, 'those of the other side'), though we do not know whether they took it when they placed the Euphrates between themselves and their brethren who remained in the Paddan-Aram, or whether it was the Canaanites who called them 'those from beyond,' or, to be more accurate, 'those who had crossed the river.'" † The Hebrew Scriptures leave no doubt as to the more or less ethnological separation effected by the Jordan.‡ In most large cities the river has formed a social division for the separation of the children of the Ghetto. According to Renan, the Tigris was, on the side of the East, a boundary which Christianity did not pass till the age of the Sassanidæ.

---

* 'Hist. People of Israel,' vol. i. p. 4.

† *Ibid.* pp. 76–7.

‡ *Cf.* Deut. xi. 30; Josh. vii. 7; *id.* xii. 1; 1st Samuel, xxxi. 7; 1st Chron. vi. 78; *id.* xii. 37.

(To be continued.)

NOTES ON LAND-BIRDS OBSERVED ON THE NORTH ATLANTIC AND GULF OF ST. LAWRENCE.

By John Trumbull.

I have collected the following occurrences of land-birds during the past five years while crossing to and from the American Continent. Most of them have been observed by myself, and where this is not the case I give the name of the observer who has kindly furnished me with the record. Where occurrences have been noted over two hundred nautical miles from land, the position is given by latitude and longitude, and under two hundred miles, the distance from the nearest land. Nearly all the notes recorded for the last four years were collected on board the R.M.S. 'Tunisian,' and where no vessel is mentioned, that boat is to be understood.

I regret that in a great many cases I have been unable to identify the specimens. I have, however, given the size as compared with some well-known land-bird. Where "small" appears, it is meant to indicate a bird about the size of a Chaffinch or Hedge-Sparrow. Descriptions of birds seen at a distance would only be too meagre, and therefore misleading. Where the hour of day is given, local or apparent time is meant. In nearly all cases where I have kept a record of the weather I have noted it briefly.

1899.

Purple Sandpiper (*Tringa striata*).—Feb. 5th. One settled on board s.s. 'Laurentian' when forty-eight miles S.W. of Cape Sable, and remained an hour during a heavy fall of snow. Strong W. wind.

Red-breasted Nuthatch (*Sitta canadensis*).—June 9th. One flew on board s.s. 'Ruapehu,' Gulf of St. Lawrence; one seen next day (10th) was probably the same bird.

Land-bird (size of House-Sparrow).—June 10th. One seen on board same vessel while off S. coast of Newfoundland.

Land-bird (small). — Sept. 11th. One alighted on board s.s. 'Parisian,' lat. 55° 57′ N., long. 31° 41′ W. Moderate S.W. wind and clear weather.

Land-bird (size of Song-Thrush).—Sept. 11th. One seen on board same steamer, lat. 55° 58′ N., long. 31° 2′ W.

Land-bird (small yellow).—Sept. 11th. One seen on board same steamer by a passenger, lat. 55° 58′ N., long. 29° 46′ W. Fresh breeze, overcast, with small rain.

Snow-Bunting (*Plectrophenax nivalis*).—Sept. 11th. Two on board, lat. 56° 00′ N., long. 29° 05′ W. Similar wind and weather. 12th. One seen, lat. 56° 28′ N., long. 22° 14′ W. Moderate N.W. wind and clear weather, with passing showers of rain.

Land-bird (small).—Aug. 23rd. Gulf of St. Lawrence. One seen at 2.30 p.m. by third officer of s.s. 'Parisian.'

Duck (species ?).—Oct. 31st. One seen flying round s.s. 'Californian' for about an hour from lat. 56° 12′ N., long. 32° 46′ W. Half gale, squally, S.W. to W.; heavy sea.

Land-bird (size of Lark).—Dec. 3rd. One seen flying about same ship, lat. 54° 49′ N., long. 26° 30′ W. Fresh S.W. wind, with misty rain. Though I was unable to identify this specimen at the time, I now have little doubt it was a Snow-Bunting.

Land-bird (size of Thrush).—Dec. 4th. One seen on board s.s. 'Numidian' by Dr. Boag, ship's surgeon, about three hundred miles east of Cape Race, Newfoundland. Clear weather after fog. Dr. Boag also informs me he saw another next day (5th) struggling in water by ship's side.

Land-bird (size of Lark).—Dec. 7th. One seen on board s.s. 'Californian,' eleven miles south of Cape Race, Newfoundland, by Mr. Mackey, second officer. Moderate E. wind and rain.

Land-bird (size of Corn-Bunting).—Dec. 18th. One alighted on board same steamer forty-eight miles north of Sable Island; it rose and flew aft, and was not seen again.

1900.

Land-bird (small) —Jan. 6th. One seen by third officer of s.s. 'Californian,' ten miles north of Malin Head, Co. Donegal. Wind N., misty rain.

Land-bird (size of Sparrow).—Aug. 25th. One observed on board for last two days. Last seen in lat. 56° 14′ N., long. 18° 42′ W. Clear after hazy weather.

Land-birds.—Sept. 10th. Gulf of St. Lawrence. Several small birds like Meadow-Pipits, including one Nuthatch (*Sitta canadensis*), from 10.30 a.m. to dusk. At 4 p.m. we had two hawks, which prevented them from gaining the shore. Each time a bird attempted to leave the ship a hawk swooped down, and obliged it to return and seek security under one of the ship's boats. One hawk, however, succeeded in capturing one.

Falcon (sp. ?).—Oct. 3rd. One seen flying about ship at at 6.5 p.m., one hundred and six miles east of Belle Isle. Clear weather.

Thrush (small).—Oct. 4th. Gulf of St. Lawrence. Two seen flying about and alighting at intervals. Hazy weather.

Land-bird (small).—Oct. 15th. Gulf of St. Lawrence. One seen flying about ship during eight to twelve morning watch. Light W.S.W. wind, overcast.

Snow-Bunting (*Plectrophenax nivalis*).—Oct. 16th. Nine seen two hundred miles east of Belle Isle. Moderate wind, cloudy and overcast. 17th. One caught at 1 a.m., lat. 53° 48′ N., long. 47° 08′; 4 p.m., five still on board; 11 p.m., two caught. One lived in the steerage, feeding on bread-crumbs, till we arrived in the Mersey (22nd). 20th. One at 3.40 p.m., ninety-five miles from land.

Jackdaw (*Corvus monedula*).—Oct. 20th. One very much weather-beaten settled on ship at 3.40 p.m., when we were one hundred and ninety-five miles from the Irish coast. Moderate S.E. wind and drizzling rain. 29th. Another seen resting on ship, lat. 56° 21′ N., long. 17° 35′ W. It was about ship at sunset, and it probably remained till daylight. Moderate N.E. breeze, clear and cloudy weather.

Carrion-Crow (*C. corone*).—Oct. 20th. One seen at same time as the first Jackdaw. It remained on board all night, and did not leave until we arrived well inside Tory Island, Co. Donegal.

1901.

Land-bird (size of Common Sparrow).—May 21st. One alighted on board at 10 a.m., when we were five miles off Cape Race, Newfoundland, and remained about ship till 4.20 p.m.

Carried eastward ninety miles. Fine weather, horizon slightly hazy.

Falcon (sp. ?). — May 21st. One caught on board 132 miles east of Cape Race. This specimen was secured by a passenger, and brought to Liverpool alive. Oct. 8th. Another (sp. ?) flew past us when we were 117 miles east of Belle Isle. Gentle N.E. wind and foggy weather.

Land-bird (small).—Sept. 21st. One settled on board when 167 miles north-east of Belmullet, Co. Mayo, the nearest land. October, two observed by Mr. Roberts, purser of s.s. 'Corinthian,' when off Belle Isle, and two seen (October) by same observer on homeward passage off Belle Isle.

Snow-Buntings (*Plectrophenax nivalis*).—Sept. 24th. Flight of twenty settled on ship, lat. 54° 33′ N., long. 44° 13′ W., and two of which were caught later; strong W. to W.N.W. winds and cloudy weather. 25th. Two remained with us till within seventy miles of Belle Isle; moderate N.N.W. gale and overcast weather. Oct. 8th. One settled on ship at 9.45 a.m., eighty-eight miles north-east of Belle Isle; one caught and another seen 106 miles further east; the captured specimen lived till next day. 10th. Twelve with us from daylight, lat. 55° 45′ N., long. 35° 37′ W., to lat. 56° 15′ N., long. 31° 13′ W. 11th. Four at daylight, lat. 56° 06′ N., long. 25° 50′ W., one remaining till dusk, lat. 56° 06′ N., long. 21° 24′ W. 12th. One with us to-day, probably one of the same birds we had yesterday. Mr. Roberts tells me he observed two on s.s. 'Corinthian' when off Belle Isle in October.

Goldcrest (*Regulus cristatus*).—Oct. 10th. One at 5.25 p.m., lat. 56° 15′ N., long. 31° 13′ W. I have already recorded this occurrence.*

Land-bird (size of Song-Thrush).—Oct. 25th. One alighted on board three miles north-east of Innistrahull; fresh W.S.W. wind, overcast, squally weather.

Land-bird (small).—Nov. 1st. Gulf of St. Lawrence. One seen resting on ship by Capt. Vipond between 8 and 9 a.m.; light W. wind, fine weather, with distant haze.

1902.

Hawk (sp. ?). — March 30th. Bay of Fundy. One settled on mast at 9.50 a.m. for a few minutes. Aug. 29th. Gulf of St. Lawrence. Another (sp. ?) seen by Capt. Imrie of s.s. 'Orcadian' from noon till 1.30 p.m. Fine clear weather, moderate W. wind.

---

* 'Zoologist,' 1901, p. 423.

American "Robin" (*Turdus migratorius*).—March 30th. Bay of Fundy. One seen by our pilot.

Land-bird (small). —April 26th. One seen by Mr. Cook, chief officer, at 7 a.m., 150 miles from the Irish coast.

Plover (Dotterel ?).—April 26th, 5.2 p.m. One flying about and keeping with us for an hour, lat. 54° 48′ N., long. 18° 44′ W. It made several attempts to leave, flying with the wind, but returned, uttering a call-note each time. It was not seen to settle on ship.

Savannah Sparrow (*Passerculus sandwichensis*).*—May 2nd. Gulf of St. Lawrence. One caught by one of our officers at 1 a.m. while resting, when we were abeam of the Bird Rocks. Moderate S.S.E. wind and overcast.

Swallow (*Hirundo rustica*).—May 30th. About twenty miles west of Tory Island, Co. Donegal. Three flying about and resting at times from 4.30 p.m. till midnight. Strong, following E. wind.

Wheatear (*Saxicola œnanthe*).—May 31st. One seen between 11 a.m. and noon, and still about at 4.15 p.m., lat. 55° 07′ N., long. 16° 20′ W.

Barn-Swallow (*Hirundo erythrogastra*).—June 3rd. One seen between 6 and 7 p.m., and caught at 10.15 p.m., lat. 45° 33′ N., long. 47° 40′ W. Early morning hazy, rest of day clear; wind veering from S.W. to N.W.

Lincoln's Song-Sparrow (*Melospiza lincolni*).—June 3rd. One first observed at 11.30 a.m., lat. 49° 51′ N., long. 45° 39′ W., and killed about an hour later.

Land-bird (small).—Aug. 29th. Gulf of St. Lawrence. One observed on board s.s. 'Orcadian' by Capt. Imrie. It kept with the ship for about an hour. Clear, moderate W. wind.

Snow-Bunting (*Plectrophenax nivalis*).—Oct. 2nd. One seen at 2.30 p.m., lat. 54° 54′ N., long. 42° 09′ W., by Mr. Gourlay, second officer. Fresh easterly winds, with hazy weather. Steamer has just emerged from continued spell of fog extending from Belle Isle eastward. 4th. Capt. Imrie writes me that about a dozen settled on his ship while passing through the straits of

---

* Probably the *P. sandwichensis savanna* (Wilson); *cf.* Ridgway, 'Birds North. and Middle Amer.' vol. i. p. 192.—Ed.

Belle Isle, and remained on board, but decreasing in number till lat. 56° 00′ N., long. 31° 00′ W. was reached.

Land-bird (small). — Nov. 4th. One seen by Mr. Towers, fourth officer, at 2.35 p.m., lat. 54° 50′ N., long. 43° 12′ W.

Land-bird (small).—Nov. 5th. One with us for about two hours from lat. 56° 34′ N., long. 34° 58′ W.; moderate S. breeze.

Snipe (sp. ?). — Nov. 6th. One first seen at 1 p.m., lat. 56° 02′ N., long. 35° 00′ W.; it kept with us for about two hours. Fresh N.N.E. breeze, clear cold weather.

Land-bird (size of Song-Thrush).—Nov. 8th. One observed by Mr. Cook, chief officer, at 10 a.m., lat. 56° 14′ N., long. 15° 24′ W.

1903.

American "Robin" (*Turdus migratorius*).—April 19th. Twenty-five miles south-east of Halifax, Nova Scotia, two seen following ship for short time; foggy weather, with rain. June 15th. Mr. Cahill, purser of s.s. 'Peruvian,' tells me one alighted on board his steamer when 700 miles east of St. John, Newfoundland, and remained on board for about a day. Another record referring to this species has unfortunately been mislaid.

Meadow-Pipit (*Anthus pratensis*). — April 27th, 3.10 p.m. Two with us from lat. 54° 20′ N., long. 17° 17′ W. One of them disappeared down a ventilator at 7 p.m., and was not seen again. The other remained on board till we arrived in Liverpool (29th), having been with us thirty hours, and carried eastward over 400 miles.

Land-birds (small).—June 18th. Sixteen miles south-east of Cape Ray, Newfoundland; few about ship. Fresh N.N.E. breeze and overcast.

Warbler (sp. ?). — June 18th. Gulf of St. Lawrence, twenty-four miles north-east of Bird Rocks. A steerage passenger gave me this specimen, which he found in an exhausted condition on deck. It only lived a short time, and I preserved the skin, which still awaits identification.

Snow-Buntings (*Plectrophenax nivalis*).—July 16th. Dr. Lees, surgeon, tells me one came on board the s.s. 'Pomeranian' when 400 miles east of Belle Isle. Oct. 13th, seventy miles east of Belle Isle, one seen flying about ship.

Swift (sp. ?). — July 17th. Twenty-four miles west of

Tory Island, Co. Donegal, one seen at sunset flying about ship for ten minutes.

Land-birds (small).—July 22nd. Eighty-seven miles east of Belle Isle, three settled on ship. Weather clearing after dense fog.

Red-breasted Nuthatch (*Sitta canadensis*).—Aug. 3rd. Gulf of St. Lawrence. We had a very tame example on board, which rested some time on a passenger's shoulder. Gentle N.W. breeze and clear weather.

White-winged Crossbill (*Loxia leucoptera*).—Aug. 3rd. Gulf of St. Lawrence. One of our crew gave me this specimen, which he caught at 3.30 p.m. West breeze, clear.

Swallow (*Hirundo rustica*).—Aug. 22nd. Flight numbering about 150 settled on ship, lat. 56° 19′ N., long. 18° 50′ W., and remained all night. Two were subsequently found dead, and kept for me in the cold storage, but unfortunately the position where they were found was not noted. Fresh W. breeze, fine clear weather.

Hawk (sp. ?).—Sept. 8th. One killed on board 185 miles east of Belle Isle; moderate E. breeze, clear, but overcast. Oct. 16th. One (sp. ?) with us from 4.30 p.m., lat. 56° 24′ N., long. 24° 47′ W., to 4.50 p.m., when it was disturbed by one of our crew.

Wheatear (*Saxicola œnanthe*).—Sept. 26th. One young example killed at 9.30 a.m., lat. 56° 12′ N., long. 15° 20′ W.; it was first noticed at 6 a.m. 27th. Another observed flying about ship, lat. 56° 38′ N., long. 26° 38′ W., for five minutes. It settled on a wire-rope over bridge for a moment, and then disappeared.

Myrtle Warbler (*Dendroica coronata*).—Oct. 1st. River St. Lawrence above Rimouski; one caught at midnight. Foggy weather.

Land-birds (size of Snow-Bunting).—Oct. 13th, two miles south of Belle Isle, flight of about twenty going eastward; S.E. breeze, clear.

Land-birds (small).—Oct. 14th. One seen at 9.54 a.m., lat. 53° 54′ N., long. 47° 04′ W.; two crossed ship's bow at 12.10 p.m. Wind N.W. all day, clear weather.

Land-birds (small).—Nov. 16th. Gulf of St. Lawrence. One seen during 4 to 8 a.m. watch; four at 12.10 p.m. crossed bow, going south.

It is to be hoped that others engaged on North Atlantic vessels will record such specimens as they may happen to meet. If each ship or steamer recorded all such occurrences as take place during a year, it would furnish valuable material towards our knowledge of migration, and we would be able to form an idea of the number of birds yearly lost in this ocean. Probably nearly all land-birds which have reached this country from the American continent have availed themselves largely of vessels coming this way, and a series of records would show how far they have received assisted passages.

Before concluding, I wish to record my best thanks to Capt. Vipond of R.M.S. 'Tunisian' for calling my attention to several specimens, and to Mr. E. Cook, chief officer, for making out and verifying positions and distances. Mr. A. R. Nichols, of the Dublin Museum, has very kindly examined and named some specimens.

NOTES AND QUERIES.

AVES.

Time of Song in Cirl-Bunting.—In reading a note on the autumn songs of the Cirl-Bunting and Dipper by Mr. Swainson (*ante*, p. 73), I thought the dates on which I heard the Cirl-Bunting singing in 1902 might perhaps be of interest. The songs occurred at Aberystwyth, with the exception of that heard on Aug. 4th, which was in Dorsetshire. Dates:—April 30th, June 10th, July 5th, July 10th (near New Quay, Cardigan), Aug. 4th (Dorset), Nov. 2nd, Nov. 5th, Dec. 12th.—K. M. Angus (2, Park Street, Lapwing Lane, Didsbury, Manchester).

Two Rook's Eggs and one Moorhen's Egg in the same Nest.—On Easter Monday (April 4th), in company with Mr. G. V. Clarke and Mr. C. B. Ticehurst, I again (by kind permission of the owner, Major Sir Archibald Lamb) visited the fine rookery at Beauport, near Battle, Sussex. This rookery is remarkable for the fact that seven or eight pairs of Rooks have for some years past built their nests in the Portugal laurels under the high trees in the rookery. Close by is a small pool of water, formerly surrounded by reeds and brambles, and in this snug retreat a pair of Moorhens were accustomed to annually nest and rear their young. Some three or four years ago the reeds and brambles were all cleared away, and since that time the Moorhen has always deposited her eggs in one of the low-placed Rooks' nests, taking possession of the nest as soon as it was finished, the Rooks, strange to say, not in any way resenting the intrusion (*cf.* 'Zoologist,' 1902, p. 279). This year the Rooks for some reason or other have destroyed all the old nests in the Portugal laurels with the exception of two, which were occupied last year, and are placed on the same branch, about 18 ft. from the ground, one close above the other, at the top of a large Portugal laurel. Mr. G. V. Clarke went up to these nests, and found that the lower one contained six Moorhen's eggs, and the upper nest had in it two Rook's eggs and one Moorhen's egg. — Thomas Parkin (Fairseat, High Wickham, Hastings).

Honey-Buzzard (Pernis apivorus).—One morning about the middle of June last, I saw a gipsy woman in the street with a large brown bird dangling from her finger by a string attached to its beak. On inquiry, I found she wished to dispose of it, and she assured me it was worth a shilling or two to eat. Asked where or how she obtained it, all the information I could elicit was that it was given to her " old man " by a keeper. Whether either of the persons named knew what it was, I know not, but evidently the woman herself was in " blissful ignorance " of the " Protection Act," or she would have been more circumspect in exhibiting her prize. On closer acquaintance with the bird, I saw it was *Pernis apivorus*, but very unlike any of the few specimens I had previously had the pleasure of inspecting. Its plumage was an almost uniform clove-brown, with lighter shadings, caused by the edges of the feathers presenting a paler hue; throat whitish, with brown streaks; sides of the head inclining to grey, especially the scale-like feathers covering the lores, and on the breast were several small and very irregular patches of white, and its long and graceful tail was very prettily barred with two shades of brown. This appearance I supposed indicated a more or less immature condition, but it measured 23 in. long, its weight was one pound ten ounces, and its eyes were a bright yellow, which seemed to point to a more advanced age. On dissection it proved to be a female, with the ovary very undeveloped; the inference to be drawn therefrom is that it was not nesting. In its stomach were a good-sized earthworm, several whitish-looking grubs, and other insect remains; but undoubtedly its last meal had been the contents of a Thrush's nest, as the throat and "crop" were full of the black-spotted blue shells, and what they had previously contained of that songster, the plumage of the head and upper parts of the Buzzard being somewhat tarnished by the moisture exuding from its beak. Its legs were very dirty, as if it had been " scratching " in some soft earth, and near one of its ear-coverts was firmly fixed—robust and ruddy—one of those disgusting looking ticks, such as is often seen attached to Fallow Deer.—G. B. Corbin (Ringwood, Hants).

Variety of Kestrel (Falco tinnunculus) and its Parasites.—From time to time I have seen a large number of Kestrels in various states of plumage, but in November last I saw one—a female—somewhat different to any of my previous experience, in that its whole plumage, usually of a reddish fawn colour, was particularly light—of a pale buff hue suffused with pearl-grey—which made the broad dark marking upon the back and wing-coverts stand out most conspicuously, and the deeply white edges of the primaries caused those feathers to look much blacker than usual; in fact, the general appearance of the specimen at once attracted the attention of anyone interested in such matters. On handling it I saw it was infested with a number of the largest parasites I have ever found upon any bird; and they were exceedingly active, running about one's hands in a most disagreeable fashion. I, of course, do not wish to infer that the large number of these parasites and their unusual proportions had the least to do with the peculiar colour of the bird—most probably not—but their presence was at least remarkable. I secured a few of them for a microscopical friend, who, if this note should meet his eye, will perhaps tell us something about them.—G. B. Corbin (Ringwood, Hants).

Bittern in the County Waterford.—A very fine Common Bittern (*Botaurus stellaris*) was shot within a mile from here on Feb. 5th last. The farmer who killed it brought it to me, and kindly made me a present of it. It has gone for preservation to Messrs. Williams & Son. Mr. Williams says it is a male. He also says that he could not see anything in its stomach. Mr. Ussher has many interesting observations on the Bittern in his 'Birds of Ireland,' particularly with regard to the time of its occurrence. Out of one hundred and five instances noted, it appears that December is the month in which the greatest number have been obtained. In 'British Birds,' by W. H. Hudson, there is a fine coloured plate of the Bittern by the celebrated bird-artist, A. Thorburn. It is, however, doubtful whether it is as true to nature as the plate by Frohawk in 'British Birds,' by various authors, vol. iv. Most observers say the bird during the day remains with bill erect, and pointing upwards. The latter is the way in which it is drawn by Frohawk. This is the first occasion in which I have seen this really beautiful bird in the flesh.—William W. Flemyng (Coolfin, Portlaw, Co. Waterford).

Abundance of Coot (Fulica atra) in South Hants.—Some ten years ago I called attention to the then decreasing numbers of Coot frequenting this part of Hants, but during the past autumn and winter their extraordinary abundance was of almost daily comment. One man, who had spent some thirty or more years in pursuits upon the Avon, said he never saw them so abundant, even in the old days when they nested commonly on the river, and the abundance seems to be wholly due to migration, as comparatively few birds were reared in the vicinity, although during the past few seasons a gradual increase of the species has taken place. I understand a similar abundance was noticed in East Dorset, and one thousand birds were reported to have been killed in one day's shooting. There are still an unusual number in this neighbourhood, although so many were killed, but whether they will stay to nest remains to be seen.—G. B. Corbin (Ringwood, Hants).

Wildfowl on the Hampshire Avon during Winter of 1903–04.—The year 1903 will be long remembered for the continued rains, and, in this neighbourhood, consequent floods resulting therefrom. Much the greater part of past year, and far into 1904, the low-lying lands near the Avon were under water, so that a very small proportion of grass was obtainable for hay, and even the grazing in some parts was almost nil, much to the annoyance and loss of the farming community. This condition of things continuing through the whole winter, may have had the effect of bringing up from the sea more Salmon than usual to the formerly prolific gravelly spawning-beds of the Avon, now, alas! few and far between, for the muddy and uncleansed state of the river has no doubt helped to decrease the production and existence of both Salmon and Trout, if not others of the same class of fish, although a general decrease has taken place in many places throughout the country, where everything advisable has been done for the well-being of the finny tribes. The flooded meadows presented a most attractive site to the various wildfowl, who, taking advantage of the state of things, visited the locality in unusual numbers; but, from a sportsman's point of view, the past winter was anything but "good" as to numbers "bagged," as wildfowl on an open meadow are very different to be approached than where dense osier and artificial barriers screen the gunner. I have before noticed that when the conditions are similar with regard to flood, there are usually a large number of Teal, and the past winter has not been an exception, a flock of some three hundred or four hundred birds having been frequently seen, but, as far as I could learn, comparatively few killed. Wild Ducks were very common. Wigeon were not so abundant as they are some seasons, but large numbers were heard at night passing to and fro; whilst Tufted Duck, Pochard, Golden-eye, Shoveler, and Pintail—mostly immature birds—were not particularly scarce, and I knew of at least three Gadwall having been killed. Upon one estate bordering the river only one day's shooting was obtainable, and that with difficulty, throughout the season, but three or four guns accounted for the following bag, *viz.* Wild Duck, 132; Teal, 115; Wigeon, 10; Shoveler, 5; Tufted Duck, 2; Pochard, 2; Coot, 186; Moorhen, 7; Snipe, 8. Further down the river much heavier bags were made, and I believe little or no hand-rearing of birds was done last year. I am sorry to say, amongst the abundance of birds, no Goosander or Smew seem to have visited their old haunts; I heard of one *Mergus*, but from description of its size, &c., I suspect it was a young female Red-breasted Merganser (*Mergus serrator*), but I did not see it. A few Geese were seen, described as small and dark—probably Brent—but I did not hear of any being killed in the locality. Several of the Bittern (*Botaurus stellaris*) were observed, and, although I knew of two of this handsome species having been shot, I knew of several still frequenting the vicinity after March 1st, when the shooting ceased. There must have been quite a number upon the water from Salisbury to Christchurch, as I am certain they were not the same birds I heard of from different localities, and is it not a recognized habit of the Bittern not to wander far when it has found a suitable feeding-ground? A friend of mine, who attended those who were "cripple-hunting" the day after the "shoot" I have mentioned, told me that from a large reed-covered island in mid-stream no fewer than three Bitterns were flushed, and two of them hovered over and around the dog in a most peculiar manner, and, to use his words, "if it had been the right time of year, I should have thought a nest or young were near, as the birds seemed to take very little notice of our near approach." The proprietor of the estate—all honour to him—had given orders that if any Bitterns were seen they were not to be molested, and the birds seem to have taken advantage of the protection afforded them, for on the return of the men they were still flying around the spot they had chosen. Beside the species already enumerated, the Little Grebe (*Podicipes fluviatilis*), which had become somewhat scarce, appeared in some numbers, and their sharp little note was frequently heard—oftener, indeed, than the birds were seen.—G. B. Corbin (Ringwood, Hants).

Ornithological Notes from Aberdeen—February and March.—Lapwings (*Vanellus cristatus*) appeared on Feb. 24th, while the Sky-Lark (*Alauda arvensis*) commenced to sing at the same date. A subsequent abnormal feature, owing to the very stormy nature of the weather, was the presence of a flock of Snowflakes (*Plectrophenax nivalis*); while the Great Curlew (*Numenius arquata*) was seen on March 11th. The Pied Wagtail (*Motacilla lugubris*) appeared on March 12th, Starlings (*Sturnus vulgaris*) on March 12th, and the Redshank (*Totanus calidris*) was heard on March 13th. Grey and Yellow Wagtail (*Motacilla melanope*) on March 20th, two being in company; they are rather before their usual time, and probably are not numerous at this date. Pied Wagtails are common, and seem abundant this season here. The Green-billed Gull (*Larus canus*) made its appearance inland on March 30th.—William Wilson (Alford, Aberdeen, N.B.).

Oviposition in Birds.—Some few weeks back I purchased Professor Coues's 'Field and General Ornithology,' and noticed that on p. 330 the distinguished author states: "The egg traverses the passage small end foremost, like a round wedge, with obvious reference to ease of parturition." I should have accepted this very natural deduction of the process of egg-laying as indisputable had it not been for the fact that some eight years ago I was much exercised in my own mind regarding the subject, and made a number of observations thereon. Possessing a number of hens, and noticing they always stood up in the nest just previous to dropping their eggs, I used to slip under them a small tin vessel, in which I had previously put some clay worked up in water to the consistency of soft butter; the egg was always embedded "big" end downwards. I also had nesting-boxes fixed at a height of about five feet nine inches from the ground, and, on noticing a hen about to deposit her egg, I placed my hand under her *crissum*, and was thus enabled to watch the presentation of the egg, which was invariably "blunt" end first. And surely, considering that in nature it is ever "unity in variety," it must be so; mammalian births, when normal, are head ones, and the larger end of an egg contains the head of the chick.—G. H. Paddock (Mill Bank, Wellington, Salop).

Old or Local Name.—The Tydie, which Drayton mentions in the passage quoted by Mr. Aplin (*ante*, p. 117), is probably the Titmouse. Halliwell ('Dictionary of Archaic and Provincial Words') identifies the Tydie of Drayton with the Tydif or Tidif of Chaucer ("Legend of Good Women," 194; "Squire's Tale," 648); and the Tydif or Tidif of Chaucer is both by Skinner ('Etymologicon Anglicanum') and Skeat ('Glossarial Index to the Student's Chaucer') identified with the Titmouse. The name Tidife appears in Swainson ('Provincial Names,' 34) as a variant for the Blue Titmouse. Some of the spring notes of the Blue Titmouse deserve the epithet "delicate."—J. R. V. Marchant (Harrow).

PISCES.

Montagu's Sucker at Scarborough.—While poking about in rock-pools in the South Bay at Scarborough, on Feb. 24th, I found, under stones, two examples of Montagu's Sucker (*Liparis montagui*). Again, on the north shore, on March 6th, I found two other specimens. The fish is apparently not uncommon, for I am sure I have seen it before, but did not recognize the distinction between it and the Common Sea-Snail. It does not appear to have been recorded for this part of the coast, and is not mentioned in Clarke and Roebuck's 'Vertebrate Fauna of Yorkshire.'—W. J. Clarke (44, Huntriss Row, Scarborough).

[This fish is included in Dr. Johnston's List of Berwick Fishes.—Ed.]

NOTICES OF NEW BOOKS.

Blood Immunity and Blood Relationship. By George H. F. Nuttall, M.A., M.D., &c. Including Original Researches by G. S. Graham-Smith, M.A., M.B., &c., and T. S. P. Strangeways, M.A., M.R.C.S. Cambridge: at the University Press.

This book is of the most profound importance to evolutionists. Owing to the "imperfection of the geological record" the question of the inter-relationship among animals has been largely answered by the evidence derived from the similarities of structure in existing forms. To those of the present generation who have followed advanced evolutionary discussions, it will be remembered that the controversy once largely centred on the zoological position that man held in comparison with other animals; and that Huxley separated the Primates into Anthropoidæ (Man), Simiidæ (Apes), and Lemuridæ (Semi-Apes); whilst to-day the usual method is to place Man and Apes in one Order—the Anthropoidea. Darwin, as is well known to all who take any interest in the question, apart from similarities of structure, directed attention in his 'Descent of Man' to the wonderful evidence afforded by the study of "embryonic development." The investigation of blood-relationship is the latest discovery in our growing knowledge of the method, or rather journey, of animal evolution. As Dr. Nuttall has already elsewhere remarked, with regard to results obtained with the Anthropoidea—which applies also to other groups of animals—a common property has persisted in the bloods of certain groups of animals "throughout the ages which have elapsed during their evolution from a common ancestor, and this in spite of differences of food and habits of life." We have already referred in these pages (Zool. 1902, p. 38) to Friedenthal's experimental proof of blood-relationship between Man and the Anthropoid Apes. We now read that Landois, in 1875, established, by his experiments in blood-transfusion, that where the blood transfused emanated from a closely related species, no ill-effects were observed to follow its transfusion, this being the case, for instance, when transfusion was practised between the Dog and Wolf, Horse and Donkey, Hare and Rabbit.

In the general summary of the results of 16,000 Precipitin-Tests, conducted by Dr. Nuttall and detailed in this volume, we are told that "these tests were conducted by means of antisera for Man (825 tests), Chimpanzee (47 tests), Ourang (81 tests), *Cercopithecus* (733 tests). Maximum reactions were only obtained with bloods of Primates. The degrees of reaction obtained indicate a close relationship between the *Hominidæ* and *Simiidæ*, a more distant relationship with the *Cercopithecidæ*, the bloods of *Cebidæ* and *Hapalidæ* giving still smaller reactions than the last." All four antisera failed to produce reactions with the two bloods of *Lemuridæ* tested, except when sufficiently powerful to also produce reactions with other mammalian bloods. "From this we may conclude that the Lemurs properly belong to an Order separate from the other Primates." It will thus be seen that these results are corroborative to general views on Anthropoidean descent derived from other facts and advocated on other lines. This study of blood-relationship in animals in a comparative sense recalls the method used in Comparative Philology and Comparative Theology, and may carry us very far indeed.

In thus calling attention to the dominant zoological trend of this book, as can be only done in these pages, we must not let it be suggested that we are dealing with a volume of theoretical tendency. On the contrary, it is a very technical work indeed, fully explanatory of the method of study and experiment pursued, of terminology employed, and lavish in tabular demonstration of results, to which our space forbids adequate recognition. It is another of the many standard zoological contributions made by the University Press of Cambridge.

A Naturalist in the Guianas. By EUGÈNE ANDRÉ, F.R.G.S., F.Z.S., &c. Smith, Elder & Co.

MR. ANDRÉ has explored and written on a region which possesses the greatest interest to all naturalists; it has been made classical by Humboldt, and Mr. Rodway has described its botanical features 'In the Guiana Forest.' This book, interesting as it is, is unfortunately the story of a failure : a catastrophe on the upper rivers destroyed collections, notes, photographs, and all that might have made a notable zoological expedition. As it is, this ascent of the Caura River to within five degrees of the Equator is a considerable exploit, and its narrative is full of the charm that appertains to a natural history expedition. If we do not receive many new zoological facts—as would doubtless have been the case had the misfortune not occurred—the book teems with impressions that a naturalist can really appreciate as material of no little value. Mr. André possesses that absolutely indispensable habit of mind in a traveller which can adapt itself to a primitive ethic, and procure the esteem and confidence of very mixed followers ; this has enabled him to learn and tell us much of the social life and views of the scattered people who inhabit the banks of these rivers, and to render the volume of considerable ethnological interest. We are made familiar with many habits of the Tapir, and there are many ornithological observations. Mr. André on one occasion allows himself to theorise, a practice, once considered, as to be only used with the greatest caution, but one now generally extolled, and almost demanded. He writes :—"The bright scarlet or yellow breasts of the Trogons appear to have been specially designed for attracting the flies and other insects on which these birds subsist. What is more likely than that an insect in search of food should mistake the patch of red adorning the collared Trogon for the crimson flower of the rose of the forest, as the natives call the *Brownea?*"

We trust the author will yet succeed in making another expedition, and on that occasion reach his goal, "the distant villages on the Parime Mountains."

The Life-History of British Lizards, and their Local Distribution in the British Isles. By GERALD R. LEIGHTON, M.D., F.R.S.E. Edinburgh: George A. Morton. London: Simpkin, Marshall & Co., Ltd.

Two years ago Dr. Leighton published a book entitled 'British Serpents,' which was noticed in these pages ; he has now given us a companion volume on 'British Lizards,' which will doubtless be received with equal favour by all interested in our British fauna. It is very nicely illustrated, and written on the lines of his previous volume; while the author has paid so much attention to these animals that he is able to give us a very adequate information on their habits and local distribution. On the last subject, in reference to the Sand-Lizard (*Lacerta agilis*), we read: "It has been stated to occur in Berkshire, but the evidence is not good." We think, however, that the testimony of Capt. S. S. Flower (Zool. 1901, p. 430) is conclusive. A specimen was caught in the neighbourhood of Wellington College, Berkshire (1886), was deposited in the London Zoological Gardens, and is enumerated in the Society's 'List Vert. Animals,' 9th ed. p. 594 (1896).

To such an excellent publication we have no wish to be critical, but it is probable that one paragraph in the introduction will be imperfectly understood for want of greater precision in its composition. Dr. Leighton is discussing the operation of describing a new species, and writes:—"He would begin, perhaps, by stating the locality in which he found the specimen, the only locality in which it was at the time known to occur. This statement is the *Geographical Distribution* or *Zoogeography* of the animal, and is one aspect of animal description. It is, in other words, its distribution *in Space*, as far as is known." We would suggest that the locality is but a habitat, or the habitat in which the species was first found, and that it is only when the species is known to occur nowhere else, or when its other habitats are discovered, that any contribution has been made to Geographical Distribution or Zoogeography, not *in space*, but on the surface of this planet. We feel sure that Dr. Leighton will accept this suggestion in the spirit in which it is offered, and that it in no way detracts from the recognition of an excellent and welcome addition to a knowledge of our insular fauna.

Index Faunæ Novæ Zealandiæ. Edited by Capt. F. W. Hutton, F.R.S. Dulau & Co.

This volume will prove of no inconsiderable value to those naturalists who may desire, in a non-special sense, to obtain a general view of the New Zealand fauna. In some orders the lists are brought up to date, and the synonymical corrections of later authors assimilated; in some others, especially in one group of insects, these notes seem to have been ignored, and, to take the Cicadas for example, more descriptive names are recorded than species really exist, as has been pointed out years ago. But, as Capt. Hutton remarks in the Preface: "The list—as its name implies—is an index only. . . . Also, it is only a record, not a revision." The Introduction is a most interesting contribution to the zoology of New Zealand. The historical section details the visits of well-known naturalists since the time of Capt. Cook's first voyage. Capt. Hutton states again and proves the thesis that New Zealand is not an oceanic island, and to account for the various elements in its fauna "it is necessary to assume the existence of a former continent, either in the Antarctic regions or in the Pacific." The theory of submerged continents is often deprecated, but it throws light on many biological problems, and affords an apparent—frequently the only—explanation to many riddles in zoo-geography.

New Zealand Neuroptera. By G. V. Hudson, F.E.S. West, Newman & Co.

Mr. Hudson, who has done much in adding to our knowledge of the entomology of New Zealand, has devoted this volume to the order Neuroptera, in which he has included the Odonata (Dragonflies). The principal work done in the description of these insects has been accomplished from time to time by our countryman, Mr. McLachlan, whose descriptions are generally reproduced. The special value of this publication is in its account of the habits and life-histories of many of the species enumerated, which comprise "some of the most important and conspicuous neuropterous insects" inhabiting the rivers, streams, and lakes of New Zealand. Another element in unique information is an appendix on the insect-food of Trout in that country. Eleven coloured plates produced by the process of chromolithography add considerably to the value of a very useful book.

EDITORIAL GLEANINGS.

We were much indebted to the Secretary of the Society of Arts for advanced proofs of a lecture delivered last year before his Society by Mr. E. North Buxton, on the Preservation of Big Game in Africa. Unfortunately our space has not enabled us previously to make use of this most interesting material, and we now seize the first opportunity of publishing adequate extracts from the same:—

"Of course, man, the destroyer, has always been at his work, but his power has enormously increased, and should be tempered by mercy. If you compare the weapons of old with modern arms of precision, you will understand the ever-increasing rate at which the depletion of life goes on. What was the primitive way? I call an eye-witness of one hundred years ago:—'By means of signals from natives posted on high, an immense concourse of men and dogs were speedily assembled near the deep and bushy ravine in which the Elephants had taken refuge. The clamour of the naked hunters, reverberated by the precipices, became tremendous. I was frequently constrained to tremble for the safety of the pursuers whilst witnessing their fearless advances towards the huge and irritated victims, seeing that their slender lance constituted the whole of their armour. To see them, in a state of perfect nudity, boldly proceeding to within reach of one of these powerful brutes, could not but give rise to the most serious apprehensions. Three out of the number were at length brought to the ground, and several others severely speared.'

"You will understand that from such a contest there were plenty of survivors. Now skip thirty years, and listen to this by way of comparison. By that time the power of the rifle had begun to be appreciated, and the favourite weapon was a two-groove rifle, and a belted spherical bullet:—'I crawled in and came upon a kind of backwater from the main river, 150 yards long by 50 wide, with high banks, especially the one opposite me, on which sat dear old —— blazing away right merrily. "What is it?" I shouted. "Look at those breasts," he replied. Bang! "There, again." The pool was alive with monstrous heads, and, though this was the first time I had seen the Hippopotamus in the flesh, there was no mistaking him. I opened fire at once from my side, at heads which showed for a second above water. Nothing came of it. Though the Hippopotamus were hit every time, not one of them seemed to die. No results of the thirty or forty shots that had been fired, and yet the animals were within twenty or twenty-five yards of us. "Have you killed any, old fellow?" I shouted, and the answer came back to me, "No; but I have hit all I fired at." The evening was closing in. One Hippopotamus floated up dead on ——'s side. Next morning, however, on the surface lay fourteen huge bodies.'

"Now come to quite recent times. When in Vienna the other day, I saw, at the taxidermist's, the bag of a sportsman just returned from Somaliland. Among other things there were seventy heads of Soemmering's Gazelle. What can one man want with seventy specimens? But the remarkable thing about them was that nearly the whole were females or immature males. To anyone knowing the habits of this species, which is to feed in large herds on the open plain, where they may be readily approached to within three or four hundred yards, it was perfectly evident that these had been obtained by shooting into the brown at about that distance—a very easy thing with a modern small-bore rifle, but hideously destructive and cruel.

"It is the invention of smokeless powder and small-bore bullets which marks this latest advance in destruction. Their enormous speed and penetration and absence of recoil make fun-shooting easy, even to a beginner; while the lightness and cheapness of cartridges tempt the novice to carry a number, and to fire them away at long ranges. Why, it has revolutionized war, and enabled a small and backward people to hold at bay a powerful empire. What wonder if it gives the greedy sportsman an undue advantage.

"I am here to-night to try and focus and unite the growing public sentiment in favour of the restriction of the energies of that class of sportsmen whose frenzy and ignorance have been responsible for such terrible destruction. I cannot do better, I think, than concentrate your attention for a few minutes on the marvellously rich fauna of South Africa a century ago, and compare it with the state of things at the present day.

"Here is an old calf-bound book, given to me by my grandfather fifty-four years ago, and which had lain for a similar period on the family bookshelf. I may be excused for reverting to it, as I imbibed from it the first love of the wilderness. It is a translation of the travels of M. Vaillant, a Frenchman, in 1780. He trekked out from the Cape, and thus describes what he saw in the near neighbourhood:—'In the space of four leagues,' he says, 'we had on all sides very near us Gazelles, Bontibocks, Bubales, with numbers of Zebras, Ostriches, &c. My Dogs eagerly pursued these creatures, who mingled as they fled, and altogether formed one vast herd, but the moment I had called off my Dogs, and they thought themselves out of danger, each different species composed a separate band, and kept at a certain distance from each other. Had it not been for my Dogs, I could have shot numbers of them from my waggons, for they were very tame, and seemed pleased to gaze on us.'

"He also notices the Blue Buck, which has now passed for ever, and immense herds of Buffaloes and Elephants, 'so amazingly numerous that we thought it inadvisable to dispute their passage—my camp, animals, and carriages would have been pulverized in a moment.' Even at that period the unnecessary slaughter of wild animals had excited attention. The Swede, Sparrman, wrote, in 1786, of 'sportsmen who merely for the pleasure of shooting are guilty of wasting the treasures of nature in a most unjustifiable manner, and thus spoil their own sport as well as that of others. For when,' he says, 'they make a hunting expedition, they seldom or ever return from the pursuit of a herd of game before they have made great havoc among them, though the carcases are afterwards left to rot on the ground.'

"It was, however, well into the nineteenth century before the worst slaughter began. From year to year improved communications, the repute of those who had gone before, and better weapons, tempted fresh adventurers into the wilderness. Gordon Cumming was one of the pioneers. In my youth I regarded him as a hero, as did many others. I have somewhat altered my opinion. Here are specimens of his practice taken at random:—'In the evening I shot a lovely Fawn and a big Pallah. I wounded a White Rhinoceros, but did not follow it, and in returning to camp started an Ostrich off her nest. It contained twenty eggs, which I directed the Bechuanas to bring to camp. As we held up the side of the river, I killed a very fine old Black Rhinoceros, and, cutting off his horns, rode home (that is, leaving to waste meat enough to feed a village). In the course of the day I saw the fresh spoor of about twenty varieties of large game, and most of the animals themselves, namely, Elephant, Black, White, and Long-horned Rhinoceros, Hippopotamus, Camel-Leopard, Buffalo, Wildebeest, Zebra, Waterbuck, Sassayly, Koodoo, Pallah, Springbuck, Boar, Dinker, Steinbuck, Lion. Besides the game which I have noted, the following are not uncommon: Eland, Oryx, Roan, Sable, Antelope, Hartebeest, Klipspringer, and others.'

"The above list, of course, by no means exhausts the fauna of South Africa, probably at that time the richest of the world. At least forty species of great game may be found recorded. In recording the death of his fiftieth bull Elephant, he adds the words, 'not to mention numbers lost,' as if that were something to his credit. Indeed, it would seem that the numbers lost were almost equal to those secured.

"Thirty years later most of the Cape Colony was denuded of game, but Oswell, Livingstone, and others still found vast herds beyond the Orange River. Near the Matopo River, Oswell describes: 'Seven different kinds of animals within view, some, especially the Quaggas and Buffaloes, in large herds, Springbucks, Hartebeest, Gnus, &c., filling in the picture; together there could not have been less than three hundred.' Of these the Quaggas, or Mountain Zebra—a most graceful animal—are completely extinct. Here is an account of another of the beasts which have perished; the Borili, or 'sour-tempered one,' as the Kaffirs called him—the White Rhinoceros: 'Poor, stupid, old fellow,' he says; 'too quiet, as a rule, though, when thoroughly upset, reckless; he was just the very thing for young gunners to try their prentice hand on.' You see young gunners must have something to blood themselves upon which is too clumsy to get away, just as you draw the teeth of rats when you are entering a young terrier to them.

"A much more valuable world's asset at this time than the Rhinoceros or Hippopotamus were the Elephants. Oswell, in 1850, describes seeing, near Lake Gnami, four hundred Elephants standing drowsily in the shade of the detached clumps of mimosa trees as far as the eye could reach in a fairly open country. 'There was nothing but Elephants. I do not mean in serried masses, but in small separate groups.'

"But the sad story of Elephant slaughter during the nineteenth century should be examined a little more in detail. Not only has a valuable and productive asset been thrown away, but the possible use of the Elephant as a friend and servant of man been sacrificed. To what purpose was this waste? The herds were abundant throughout Cape Colony at the end of the eighteenth century, when Barrow, a secretary to the Governor, records a herd of four hundred having been seen in the neighbourhood shortly before. It is probable that up to then, and perhaps for twenty years later, the Elephants suffered no great diminution except from traditional methods—pitfalls and spears—of the natives. But by 1830 they had thinned out, and the ivory-hunters had to go further afield. When the Boers crossed the Orange River they opened out a vast ivory-bearing territory, and great numbers of hunters took to Elephant hunting as a profitable profession. Who can blame them? They had to live, and a rich field lay open to the bold pioneer who feared neither savage nor wild beast. If blame must be allotted, it is to the rulers who recked not of the slaughter going on.

The heyday of the hunters lasted for fifty years. In 1836, Captain Harris found hundreds of Elephants in the Magaliesberg (close to Pretoria), where a sterner kind of hunting has lately familiarized us with those pastures. The next move took these brave wanderers to the Zambesi, and far to the west. At an ever-increasing rate the inroads on the herds continued, until what drought or pestilence or native persecution had never effected, the modern rifle has completed, and now south of the Zambesi scarcely a single herd remains. Only a few miserable hunted remnants, just as I remember in 1884 in America, the last solitary wanderers of the Bison were being shot down by cowboys, their very rarity making them ten times as valuable as a trophy. One slight exception must be mentioned. Owing to the foresight of a few individuals, a small sanctuary was established in the Kynsna Forest, near the coast in Cape Colony, which was perhaps the forerunner of all the game-reserves now existing. The pity of it is that such an experiment was not repeated in many a fair range of mountains in Mashonaland, the Orange River State, and the Transvaal. There were not wanting among the Boer farmers enlightened men who did what they could to preserve some of the disappearing species of Antelope on their own farms, as, for instance, the White-tailed Gnu. It is to be feared that the rough work which accompanied the drives of De Wet have left but a miserable remnant, even if this species is not entirely extinguished. I rejoice to know that under Lord Milner's enlightened rule several reserves have now been established in those States and in Cape Colony, so that something may be saved. It is a suggestive fact that the chief Lobengula had a reserve for Elephants, in which it was death for anyone to hunt, and another for Hippopotamus. When that chief went down it was white men who instantly devoured the whole. It is singular that this savage potentate should have had more foresight than the civilized beings who ousted him.

"Unhappily the same story is being repeated as regards Elephants in Central Africa; notably in the upper waters of the Congo the destruction proceeds apace. The method of the Belgian is to squeeze the orange dry at the earliest possible moment. But everywhere the hand of man is against the Elephant. From their wandering habits it is to be feared these animals derive but little protection from the smaller reserves. The International Congress, which assembled in London in 1898 to consider this question, agreed upon certain recommendations to their respective Governments, but these appear to have been chiefly honoured in the breach except by ourselves.

"Coming further north, I have known of one Englishman who destroyed thirty of the small remnant of Elephants in the British

Protectorate of Somaliland. These were all females or immature males. It is not surprising that they have now disappeared from that protectorate. They are rapidly diminishing in those regions of Abyssinia which adjoin it, and, it is to be feared, in the Soudan also. One more quotation on this part of the subject will be sufficient to account for this disappearance. This time it is a French newspaper which celebrates the prowess of a certain count. It is headed, 'Four Elephants in Four Minutes,' and, as it was accompanied by a photograph, it was easy to see they were all cows or calves.

"By way of indicating the diminution even in recent years, I have tried, from such returns as I could get access to, to arrive at the figures of the exportation of ivory from various African colonies, and selected what appeared to be most important in this respect. It will be seen that in these cases, at any rate, there is a steady decrease. From the Cape we find the value of this export in 1889 was £2495, in 1898 it was £1086. In British Central Africa the value exported diminished from £18,252 in 1895 to £543 in 1902. From Zanzibar, in 1891, ivory to the value of £544,818 was exported; seven years later it was reduced to £112,914. From the Congo Portuguese territory an export of 10,982 kilog. was soon reduced to 1600 kilog. From German East African possessions the value of exported ivory in 1892 was 2,439,000 marks; five years later it was only 1,495,000 marks. Only in the Congo Free State the supply seems to be at present maintained, but I fear by methods which will only too surely bring an end. There is reason to believe that a feverish pressure is maintained from Brussels on the officials, and by them on the unfortunate natives. Notwithstanding the international prohibition, scrivelloes—that is, small tusks, valuable for billiard-balls—still come into the market.

"But I have said enough of the deplorable prodigalities of the past. It is to be hoped that this empire, whatever others may do, has sown its wild oats, and will husband its resources for the future. Under the instigation of the Foreign Office every British protectorate in Africa now has a series of ordinances for the preservation of wild animals and birds. They are mainly framed on the same model, but with some differences to suit the varying conditions. Certain specified areas are declared to be game-reserves. Licences must be taken out for a considerable payment in the case of strangers, and a much lower one for public officers or settlers. In most of them certain species of the larger game are altogether protected. Of the remaining animals, the licence specifies how many of each may be killed. As regards the commoner species, they are generally divided into two categories; of the larger and slow-breeding animals, as a rule, only two are allowed to each sportsman, while of the commoner kinds, such as Lesser Antelopes, ten may be killed. Heavy fines are enacted for offences against these regulations. Heads, horns, and skins are not allowed to be exported. Every licence-holder is required to keep a register of the animals killed by him, and to submit this to the resident officer at the expiration of his licence, or on leaving the territory. Any Elephant's tusk weighing less than eleven pounds, if found in the sportsman's possession, and all cow-ivory, is confiscated. The use of dynamite or poison for the taking of fish is forbidden. Now these regulations are all good, and, provided they are effectually enforced, they should go far, if not to prevent the diminution of the game, at least to save the species from extermination. Of these regulations, by far the most important which can be adopted by the executive government of any territory as a practical measure for the preservation of species is the constitution of an adequate sanctuary.

"Next in importance to the establishment of game-reserves, I consider the provision which is now to be found in all sets of regulations for the provinces of Central Africa, but not, I fear, in the South African colonies, namely, the obligation upon every person taking out a licence to furnish, on its expiration, a return of the game which he has killed, specifying the number and sex of each species. This condition should be imposed upon all sportsmen without distinction, and is valuable for two reasons. One is the moral effect on the careless sportsman, who is certain to acquire some sense of responsibility when he bears in mind the necessity of setting down in black and white, for official inspection, the result of every successful shot. The other reason is that these returns may—and, I hope, will—be collected from the various colonies and protectorates under the Foreign Office and Colonial Office, and issued as a parliamentary paper. In the hands of an intelligent naturalist, it will serve as a most valuable comparison from year to year of the relative abundance or scarcity of the species. I regret to say that to my knowledge these returns are not always demanded from sportsmen. When their value is recognized, I am confident that a stricter enforcement of the rules will be general.

"Some of the officers concerned have hardly realized the importance of insisting on these returns; even one or two omissions vitiate the combined total, and naturally lead to laxity in other cases. The real sportsman should welcome this rule, while the inexperienced one ought to be taught self-restraint.

"I venture also to urge on the authorities that these returns should show how many licences have been taken out in each class, and if any proceedings have been taken against offenders, and, if so, with what result. While on this point I wish to urge that the responsibility of instituting such proceedings should not rest with the game-officer when he is quite a junior official, but should be undertaken by the chief officer in the protectorate or province.

"The division of game into various categories—the 'royal list' comprising the animals of such rarity that they may not be shot at all; the larger animals and slow breeders, such as the Greater Koodoo, Rhinoceros, Elephant, and Roan Antelopes, of which only two may be killed, and the commoner Antelopes, of which a larger number is allowed—has already proved invaluable in many cases. The Government in each colony or protectorate should take into consideration from time to time the expediency of adding to this list species which have become rare, or removing others which no longer require this exceptional provision. The value of this provision is illustrated in the case of the Elands and Buffalo in British East Africa. These noble game had become very rare there four years ago. Now, owing to the special protection which they have received, they have to some extent recovered their numbers or immigrated, and considerable herds have been seen this year by sportsmen. The last measure of protection which I desire to emphasize is the prohibition of the export of skins. It must never be forgotten that it was the hide-hunters who were mainly responsible for the destruction of the Buffalo on the prairies of America.

"In conclusion, may I ask all those interested to bear in mind there are certain classes of animals in special danger, and who should be therefore specially guarded. They are:—

"(1.) Those having a very limited habitat, such as the Greater Koodoo or the White-eared Cob on the White Nile.

"(2.) Those animals which pasture on open plains, and which, owing to their conspicuous position, and to the power and range of the modern rifle, are subject to a new danger.

"(3.) The larger mammals, because they also are conspicuous and easily pursued, and especially on account of their slow breeding."

BRITISH 19 AP 1904 MUSEUM